

#### **Electronics Infrastructure**

Linda Bagby December 8-9, 2011

#### Introduction



- LArTF AC Distribution
- Cable Tray Plant
- Copper and Fiber Plant
- DZero Test Stand Plans

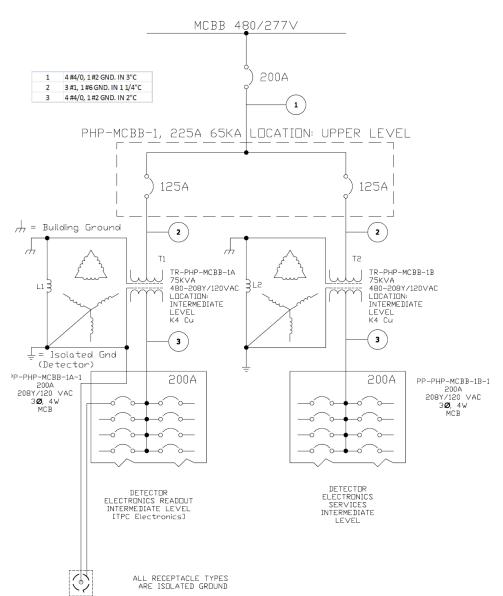
#### LArTF AC Distribution



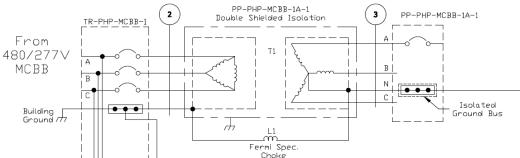
- Generated talk for Procurement and Vendor agents describing our AC Distribution scheme.
  - Met with Mike Utes and Dwight and Dave Featherston to review talk and brainstorm ideas on the mechanics of realizing the design.
  - Dave H. generated detailed wiring diagrams that Dave F. will use to inspect contractors work.
  - Minutes of meeting and talk: DocDB# 1772.
- We are ready for meeting with Procurement and Vendors for procuring double shielded transformers.

## Single Line Drawing Detail

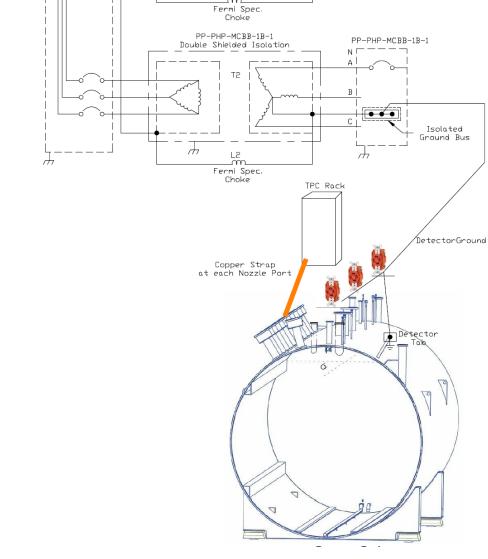




## Detail







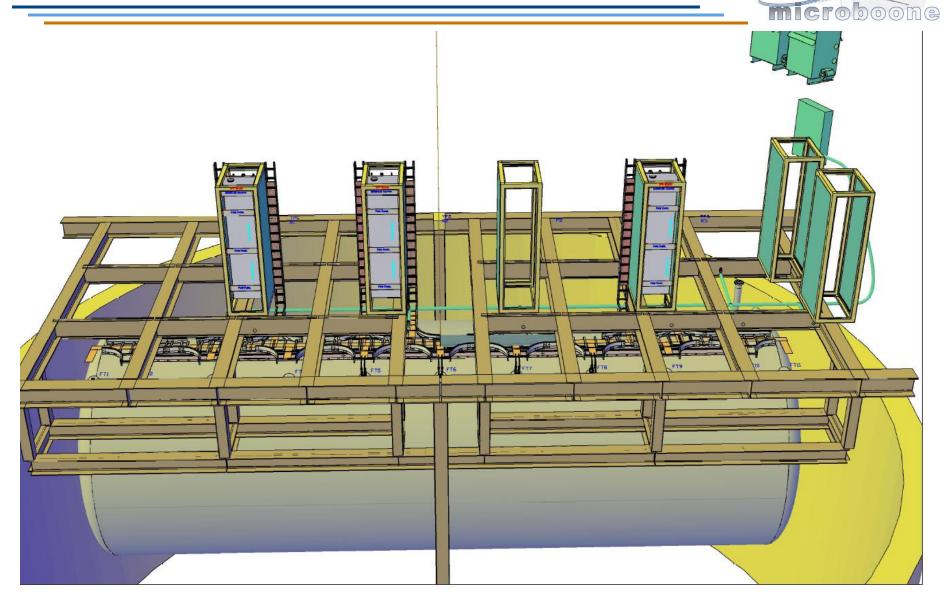
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## Cable Tray Plant



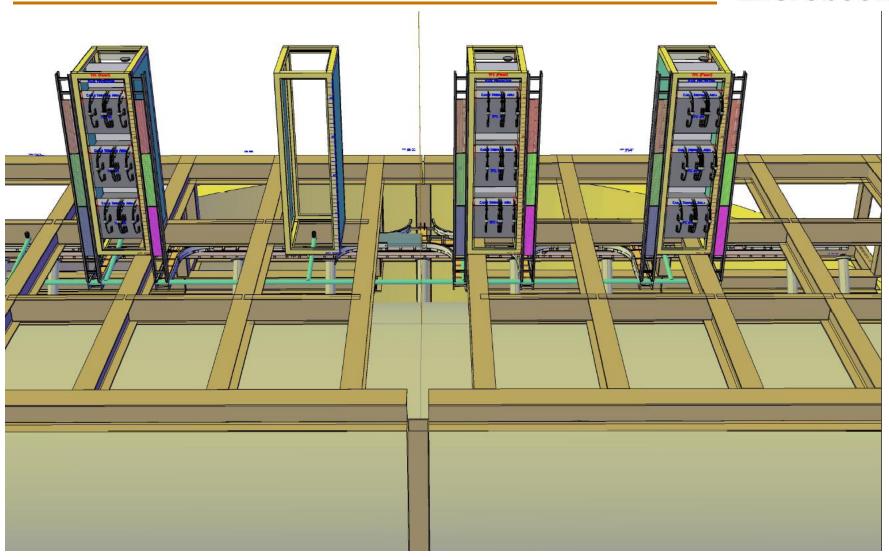
- Dave has started drawings showing where the cable trays will be located from the FT to the racks.
  - Pass these drawings to 3D modeler for integration.
- Plan to have separate areas in tray for power, signal, fiber, timing, and control cables.
- Need to use shielded cable or fiber as much as possible.
  - Reminder—Single line drawings required for all interconnects.
  - Use Chen's DocDB# 1551 as guidance.
- Need to choose plenum rated jackets to minimize damage in case of fire. (Per conversation with J. Priest, Fermi Fire Strategist—the guy that reviews equipment for fire hazards during the ORC review.)

## Conduit for Isolated Power and Ground



## Front View-Facing East





# Trays

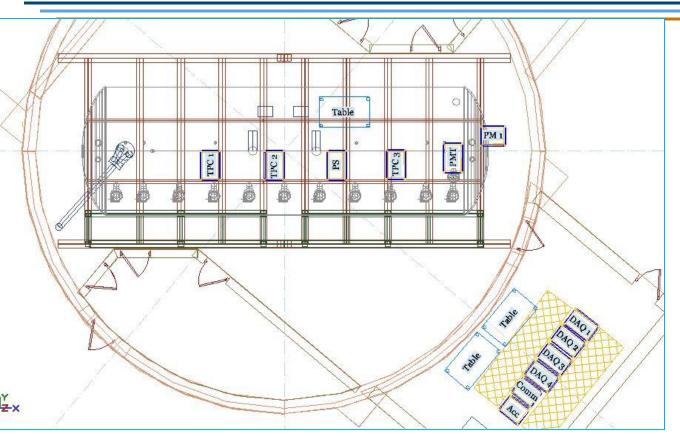


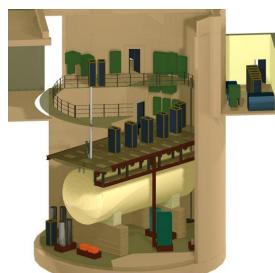


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### Rack Orientation



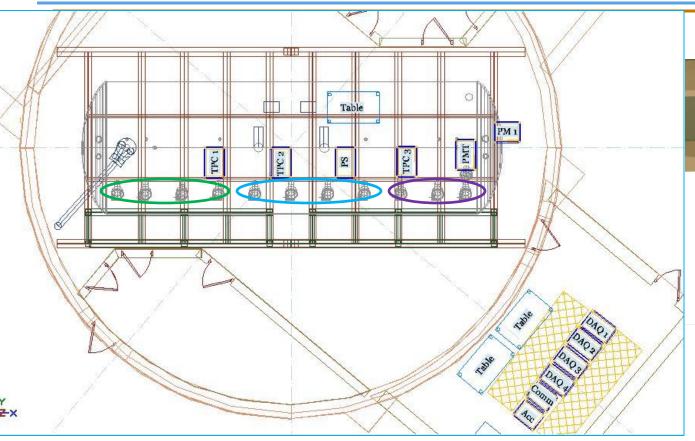


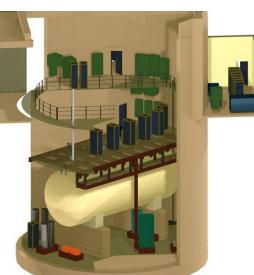


- □ Front of rack facing west.
- HV rack moved to lower level.

#### Rack Orientation



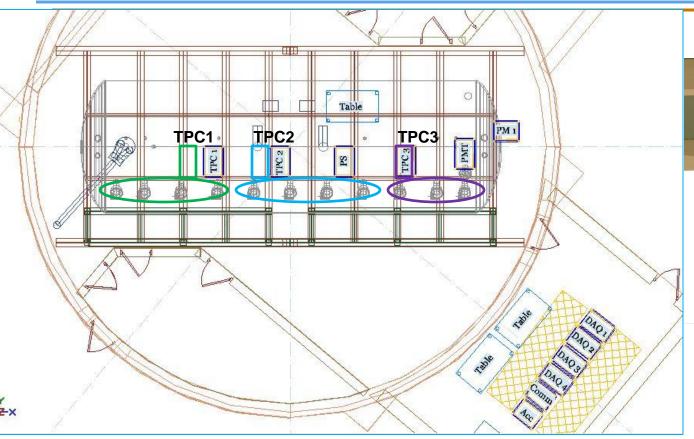


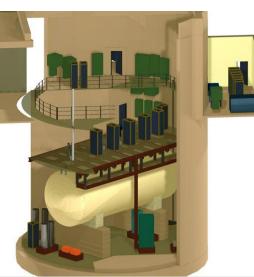


- □ Front of rack facing west.
- □ HV rack moved to lower level.
- □ FT grouping 4-4-3.
- Need cable tray on BOTH sides of racks.

#### Rack Orientation







- □ Front of rack facing west.
- □ HV rack moved to lower level.
- □ FT grouping 4-4-3.
- Position racks around framing for trays.

## Copper Cable Map Proposal 4

BEAM

SOUTH

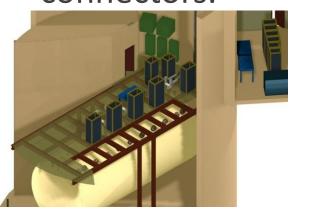


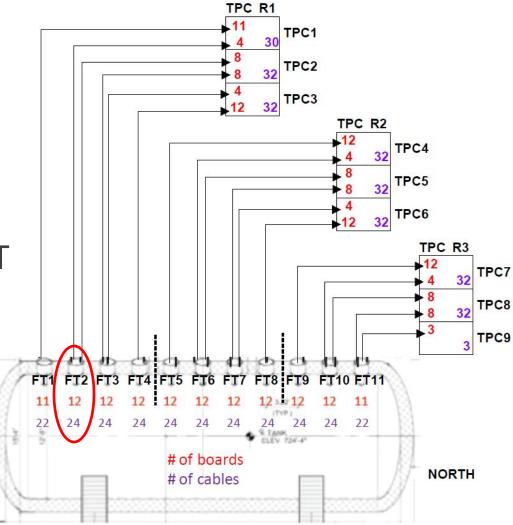
Naming convention

1 starts upstream.

Grouped TPC cables upstream to downstream.

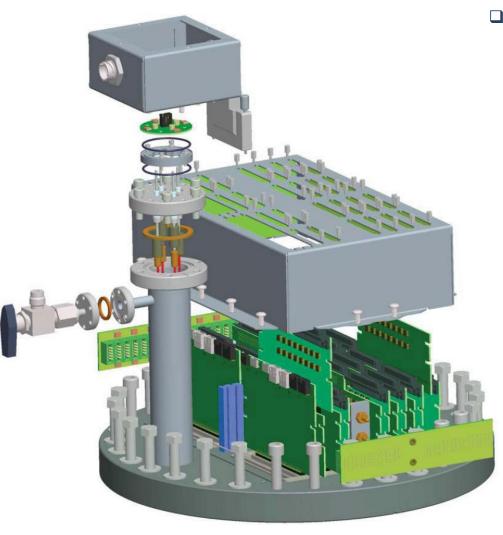
Requested map between
 ASIC mother boards and FT connectors.





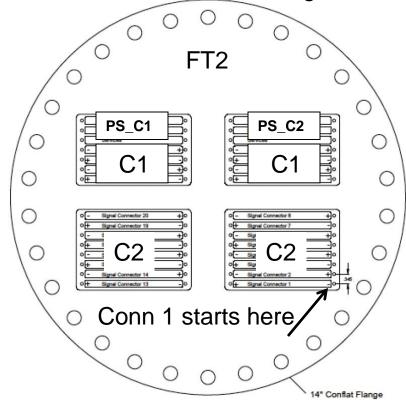
### FT Cable Plant





- □ FT 3D graphic needs to match 2D.
  - FT2 has two bundles.
    - 8 → TPCR1\_C1 (right side of crate)
    - 16 → TPCR1\_C2 (left side of crate)

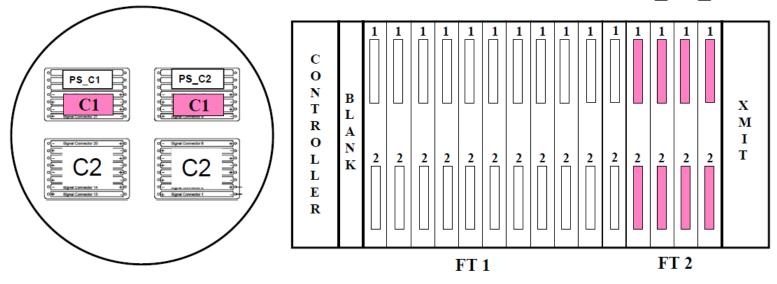
#### Standard Feedthrough

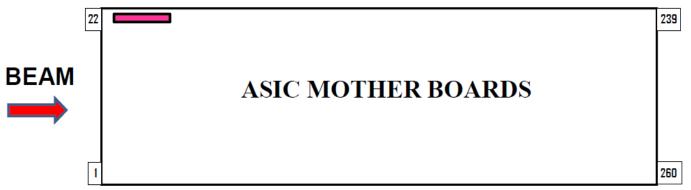


## FT2 Cu Mapping Graphic



#### FEEDTHROUGH 2: FT2 TPC RACK 1 CRATE: 1 TPC\_R1\_C1

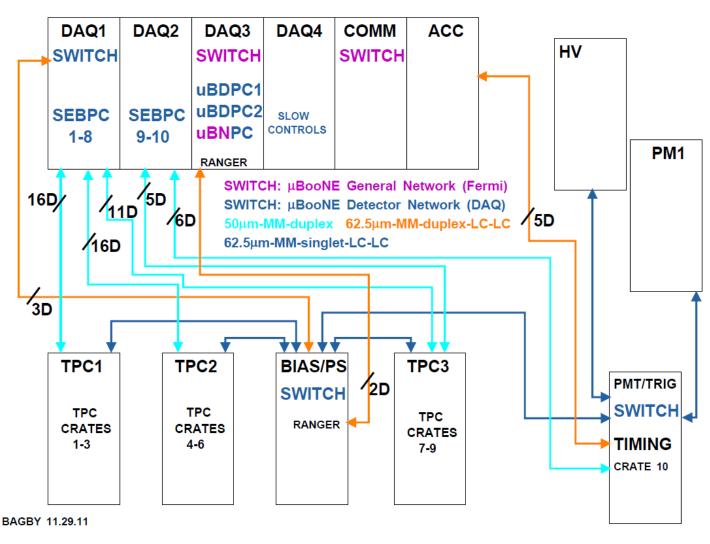




#### Fiber Plant



#### FIBER PLANT

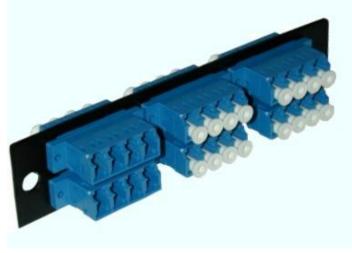


## Fiber break point needed?





Adapter Panel



Fiberdyne FB412B2G0000-96 wall mount Box w/ 4 FPA24LCM Adapter Panels: \$489.00

Coupler loss: <3dB

# Fiberdyne Quote: Fermilab120811LB

Controller XMIT Trigger	F1C92Q1GCLL100F-900/2MMX/PE	Fiberdyne using Corning 24fiber plenum 10gig aqua trunk cable, 100ft total length. One end 900um 1mtr breakout, LC. Other end 2mm breakout staggered by pairs 2-10ft (TBD by customer), LC, with pulling eye. Drawing to be provided.	\$773.21
Controller XMIT Trigger	F9C22Q2GCCC007i	Fiberdyne, MM 50/125 10gig aqua, duplex, plenum, 2.0mm jacket, LC(clip)-LC(clip), 7 inches +1"/-0".	\$19.23
Jumpers	F9C22Q2GCLL100F	Fiberdyne, MM 50um 10gig aqua, dup, plenum, 2.0mm jacket, LC(clip)-LC(clip), 100 Ft.	\$57.94
Network/Ranger	F9C22B4GCLL100F	Fiberdyne, MM 62.5, duplex, plenum, 2.0mm jacket, LC(clip)-LC(clip), 100 Ft.	\$45.87
Break Box	FB415X1G0000-96	Fiberdyne Wall mt box loaded with 96 LC ports per following (1) WMB-12 Wall mt box (3) FPA24LCQ Panels LC quad, Aqua for 10gig fibers. (1) FPA24LCM Panel LC quad, beige for regular 50um fibers.	\$489.00

## Fiber Summary



	_	_						
Fiber Plant	Туре	duplex	# of boards	# of racks	Length (ft)	Total	Cost	Notes: Cost from Fiberdyne
Controller	MM, 50μm	1	. 12		100	12		Crates: 9 TPC + 1 PMT/Trig + 1 test stand +1 spare
XMIT	MM, 50μm	4	12		100	48		
Trigger	MM, 50μm	1	. 3		100	3		Crates: 1 PMT/Trig +1 test stand + 1 spare
Spares	MM, 50μm	1		5	100	5		4 for enclosure + 1 for test stand
Total						68	\$ 4,055.80	even 70 at \$57.94 ea/quote PLENUM, 10G
						144	\$ 4,639.26	24 cond. trunk line \$773.21 ea/quote PLENUM, 10G
		duplex	# of boards	# of racks	Length (in)	Total		
Controller	MM, 50μm	1	. 12		7	12		Onboard jumpers.
XMIT	MM, 50μm	4	12		7	48		
Trigger	MM, 50μm	1	. 3		7	3		
Spares	MM, 50μm	5	j			5		
Total						68	\$ 1,346.10	even 70 at ~\$19.23 each/quote PLENUM, 10G
	<u> </u>	duplex	# of boards	# of racks	Length (ft)	Total		
DAQ1 TO PS	MM, 62.5μm	3		1	100	3		Detector network
ACC to TRIG	MM, 62.5μm	5		1	100	5		Timing to Trig card
DAQ3 to BIAS/P	S MM, 62.5μm	2		1	100	2		Ranger for Config and Calibrate system
Total						10	\$ 371.60	10 at \$37.16 each/quote
							\$ 458.70	10 at \$45.87 each/quote PLENUM

#### DAB Test Stand Plans



- Would like space next to the Hurricane Deck meeting room.
  - 2 DAQ Racks
  - TPC Rack
  - PMT/Trigger Rack
  - FEE test stand
  - Couple of tables, chairs, various tools of the trade.
  - Need access to front and rear of racks.
- Doorways to enclosed tech areas are a wee bit short for full size racks to fit through.
  - Use test stand to test fully populated crate.
  - Move crate into production rack in high bay.
- Populate TPC rack with production VICOR.
  - Use as testing ground for:
    - VICOR slow controls readback.
    - Fully populated TPC crates. Once tested, move to production rack in high bay.

#### **PMT Test Stand**



- Requested unattended operation clearance for PMT studies.
- Requires rack protection and interlocked AC distribution box.
  - A rack protection box and smoke detector are available-not networked.
  - 1 AC distribution box ordered from SurgeX @\$489.77



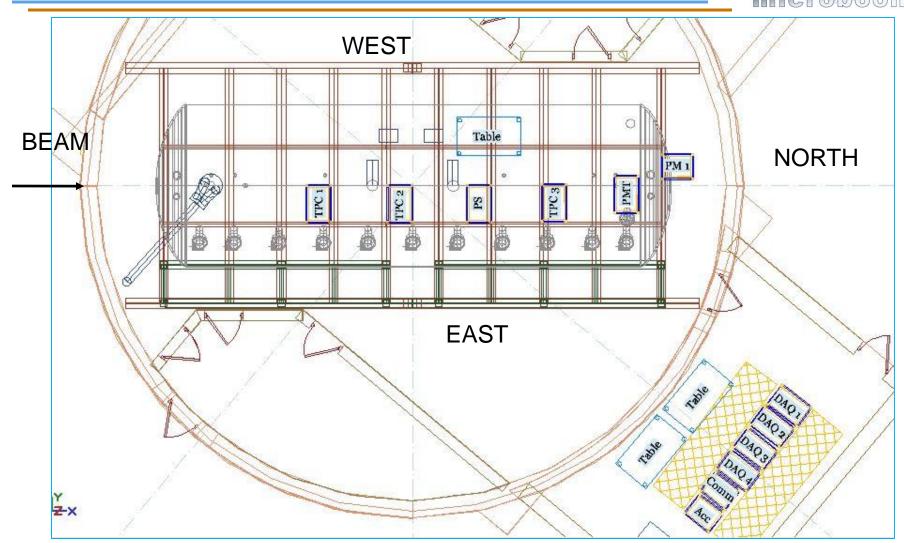
- □ 120V/ 20A
- 6 switched, 3 unswitched outlets
- Surge protection
- External interlock input

# Back-Ups



## Rack placement





## Rack placement





# Back-Ups

